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ABSTRACT

As part of a series of books and pamphlets on outdoor education, this manual deals primarily with group instruction for beginning archery students. The manual, designed to provide practical suggestions for initiating group instruction, may be used in physical education and recreation classes in schools and colleges and in programs conducted by camps, recreation departments, and other agencies concerned with teaching skills and sports. Sections are: (1) Facilities, (2) Equipment, (3) Instruction, (4) Archery Games, and (5) Advanced Instruction. Section 3 includes instructional aids, class organization, basic instructional procedure, skill and knowledge testing and evaluation, correlation of archery instruction with other interest areas, archery etiquette, instruction tips, and general safety points. A glossary and a list of books, pamphlets, periodicals, films, and archery organizations end the manual. (NQ)

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GROUP ARCHERY INSTRUCTION FOR BEGINNERS

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A PLANNING GUIDE FOR INSTRUCTORS

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FOREWORD

The Group Archery Instruction Manual will be another publication in the Outdoor Education series. This first working edition of the manual is being used primarily in archery workshops and clinics sponsored by the Outdoor Education Project in cooperation with the American Archery Council. It is hoped that all who use it will offer content suggestions which can eventually be included in a permanent publication of the AAHPER.

The manual is designed to provide practical suggestions for initiating group instruction in archery in physical education and recreation classes in schools and colleges and in programs conducted by camps, recreation departments and other agencies concerned with teaching skills and sports that have lifetime interests for increasing numbers of people.

Like other AAHPER instructional materials, the first draft of the manual was prepared by a committee of experienced teachers and leaders in archery and subsequently submitted to other experienced archery instructors for suggestions.

AAHPER gratefully acknowledges the fine work of the following committee, the American Archery Council, and all others who have contributed time and efforts to the materials on the following pages.

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INTRODUCTION

The increasing importance of the constructive use of time is a challenge to schools and recreation agencies to provide opportunities for people to acquire interests and skills that have lifelong values. Archery, long recognized as a valuable and satisfying sport, is growing in popularity as an individual and family activity.

In order to provide opportunities for people of all ages to learn the basic skills underlying all forms of archery, group instruction is necessary. In schools, colleges and public agencies particularly, archery instruction should be made available to all students and participants.

There will be a wide range in physical characteristics, muscular coordination and experience in every group. Some procedures for archery instruction presented in this manual are based on the principle that all who desire to learn the skills should have equal opportunities to develop their own interests and abilities. It is also a thesis that sufficient space and facilities are available for beginning archery and that enough equipment can be provided for beginning instruction.

This manual is primarily concerned with group instruction for beginners, with provisions for progression in competence for engaging in all types of archery suited to the students' interests.

Two important ingredients in effective group instruction for beginners are immediate participation and immediate success. This is in keeping with the fundamental principles of learning. Review, correction of faults, and adaptation to individual differences with practice and coaching normally follow as in teaching all skills.

Since this manual deals with group instruction for beginning students there could be no detailed information about many aspects of the sport. This material should be supplemented by the many excellent references available.

Those who teach archery should be qualified by having a reasonable skill and the ability to employ effective instructional techniques. In too many instances someone unprepared either in personal skills or ability to teach has been "drafted" to teach archery. In situations of this kind, in-service education is necessary, such as attendance at a workshop or clinic or special class. An increasing number of in-service activities for archery are being offered by the Outdoor Education Project of the AAHPER, colleges and universities, professional associations, and other groups.

It is hoped that this manual will be helpful to all who have the opportunity to teach archery in schools and colleges, recreation and camp agencies and adult groups.

I. FACILITIES

Indoor Facilities

Area necessary for classes. For the average beginning class, an area that measures 30' by 50' could accommodate as many as ten 36" target matts and as many as 40 shooters.

Possible areas include: gymnasium floor or balcony, band room, stage, furnace room, multipurpose room, wide corridors. (An area 30' by 50' is suggested; however, when space is limited, beginning classes can be effectively conducted in a smaller area.) An ideal size would be 90' by 90'.

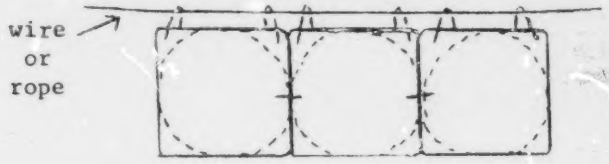
Types of target matts available:
- round matts of Johnson grass or straw
- square matts of excelsior or plastic foam

36" matts are suggested in this manual because they are a practical size for instruction--lighter in weight and easier to handle than a larger target. The newer plastic foam matts are especially portable and practical where targets must be taken in and out-of-doors for each shooting session.

NOTE: Excelsior or straw matts used indoors must be fireproofed.

Setting up the instruction area. Target matts are placed either on stands or held in place by wires or ropes. This is done by attaching wire loops to the top of each matt and by stringing the loops onto a wire or rope that is attached very securely to either standards (such as badminton or volley ball) anchored to the floor or to hooks anchored in the wall. The base of the target matts should be angled slightly toward the shooting line, with the top of the matts angled slightly backward. In the event a matt should fall, it will fall backward and thus not break arrows that might be in the target.

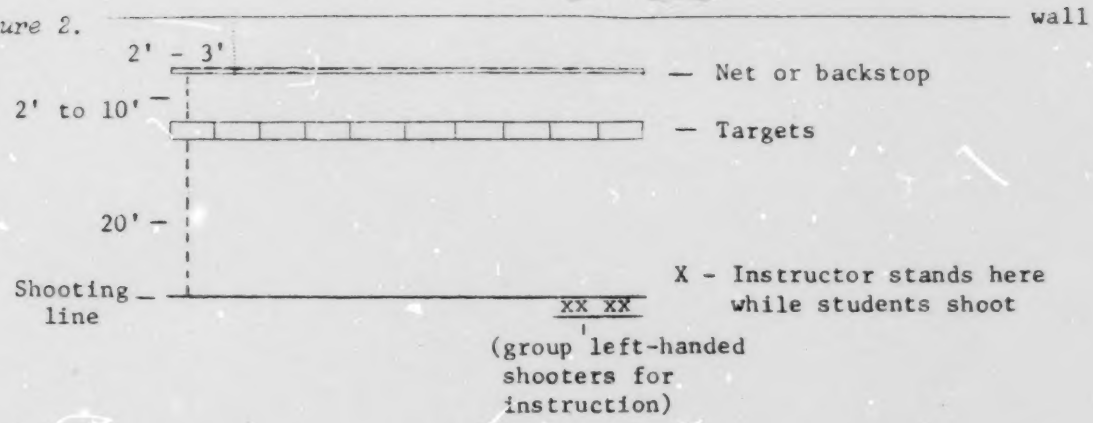
Figure 1.



Solid lines represent square matts; dotted lines round matts. Round matts should be wired to each other at the sides.

Target arrangement. The instructor's position in relation to the targets and the students during an archery class is of utmost importance. The targets should be arranged so that when the students are facing the targets, the instructor will be to the right of the students. This will allow the instructor to stand a few feet to the right of the shooting line to observe the shooters and to be heard by all shooters. Each right-handed student will then be facing the instructor when in position at the shooting line (see Figure 2 on page 3).

Figure 2.



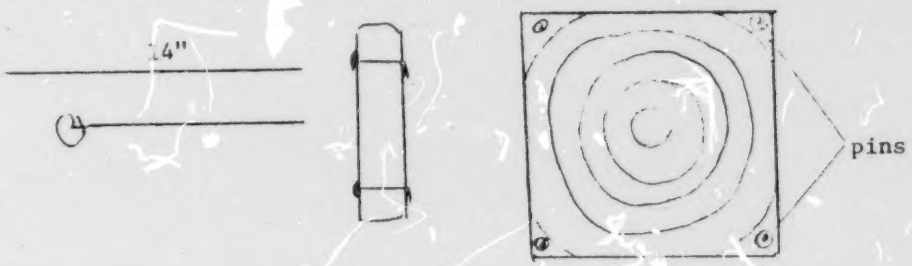
A backstop should be hung 2' to 10' behind the targets to eliminate arrows hitting the wall. Suitable backstops include commercial nylon backstop nets which are very effective in stopping arrows; an old rug or series of rugs or moving van carpets; canvas; plywood or cellotex. (If plywood or cellotex-type board is used, a minimum of 8' should be allowed between the targets and the backstop.) If a material-type of backstop is used, it should be attached at the top only and not secured at the bottom, thus allowing flexibility to absorb the shock of the arrows and prevent penetration.

Any indoor backstop should be a minimum of 8' from top to floor. If there is concern about the possibility of arrows hitting and damaging the floor in front of the targets, such as in a gymnasium, it is helpful to rest the targets on tumbling mats or a rug extended 6' to 8' in front of the targets. This will prevent low arrows from gouging the floor. (Beginning students tend to shoot high, so generally there is no need to worry about damaging the floor.)

Target faces. For basic instruction it is suggested that target faces be 36" (or same size as matts being used), 4-color (5 rings--gold, red, blue, black, white). If possible, paper target faces should be glued to corrugated board (cardboard) before attaching to the matt. This will increase target life many times. Faces can also be purchased with cardboard backing.

Target faces are attached to the matt with commercial target pins or pins can be made from clotheshanger wire or equivalent. Use a piece of wire 14" long for each pin. Make a right angle at 3", which is curved; the 11" length is put through the target face and matt and bent at the back. Use four pins in each target face.

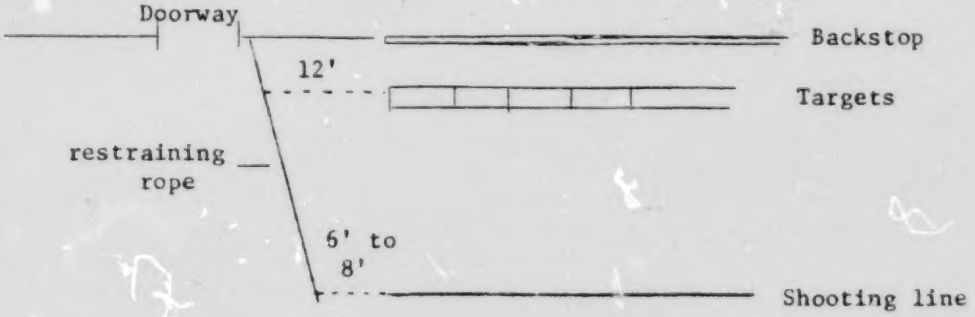
Figure 3.



To indicate the shooting line, masking tape should be placed on the floor at a distance of 20' (plus other desired distances) from the base of the targets. If masking tape is impractical or unavailable a rope or measuring tape may be used in the same fashion.

POINT OF SAFETY: *Whenever possible, arrange facilities so that there is no possibility of non-participants inadvertently walking behind the targets while shooting is in progress. In the event a path of traffic must cross the room secure a restraining rope diagonally from the shooting line to the targets with a distance of 6' to 8' beyond the end of the shooting line and a distance of 12' beyond the target line.*

Figure 4.

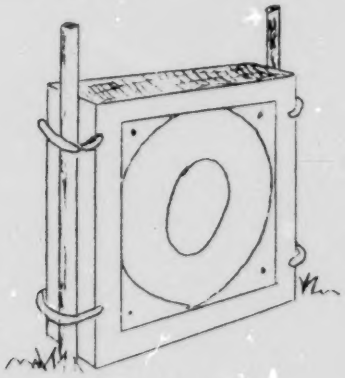


Outdoor Facilities

Where do you shoot? Any outdoor area on the school site--football field, practice field, hockey field, playground, tennis court. Safety must be the prime factor in all instances. Grass or dirt surfaces are preferable, however not necessary.

The range set-up is basically the same as indoors, with a few exceptions. The wire loops would be secured through the sides of the target matts, rather than through the tops of the matts, with metal or wooden stakes or posts placed through the loops and anchored securely in the ground.

Figure 5.



For non-permanent targets, suggested when targets must be installed immediately prior to and removed immediately following an archery class:

a) 1-1/2" pipes approximately 2' in length and spaced 38" apart can be driven into the ground until the top end of each pipe is slightly below the surface of the ground.

b) Prior to each class, the instructor and/or students can insert a 5' length of 1" pipe or stake into each of the recessed pipes and can secure the target matts to the pipes or stakes by attaching two wire loops on each side of the target matt and sliding the loops attached to the matts onto the pipes or stakes (see Figure 5).

c) If desired, the recessed pipes can have a threaded end so that a cap can be placed over the pipe opening. This will prevent rain and debris from falling into the pipes while the range is not in use.

Commercial movable target stands can also be used. Tripods can be used though are more cumbersome to transport and set up. Another idea for target stands: use track hurdles upside down and wire the matt to the legs. Be sure to anchor the tripods on an outdoor range.

Permanent installation. Permanent targets can be constructed in the following manner.

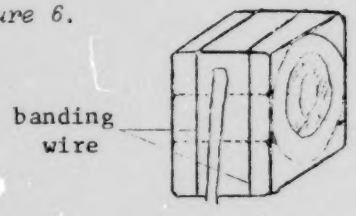
a) Each target will require two supports. The supports can be of the following materials and should be approximately 6' in length:

1" pipe
2-1/2" cedar posts
2" x 4" wooden stakes
Steel fence posts

b) Stakes should be driven into the ground 38" apart and to a depth of at least 2'. Place an old rubber tire or 2" x 4"'s on the ground between the two supports.

c) Place the bottom bale of excelsior or straw on top of the tire or 2" x 4" so that the bale does not rest on the ground. This preserves the bales and eliminates arrows sliding underneath. Stack two more bales on top of the first bale and band together all three bales by using either a banding tool or two straps of #8 wire. This is done by completely encircling the bales and tightening the wire. (In the event four or five bales are desired, the target supports should be within 6" of the top; supports should never extend higher than the top bale.)

Figure 6.



NOTE: When using metal supports it is best to cover the surface of the support with heavy rubber, such as old car tires, bicycle tires or rubber hose cut in half lengthwise.

To protect excelsior or straw bales from too much water, the top bale should be capped with a protective covering of plastic or roofing paper.

In the layout for indoor shooting, target matts are placed side by side, touching each other. If space permits (especially outdoors) spacing targets with 3' between provides more room for shooters and ease of retrieving arrows.

A shooting line can be marked by chalk, or with a rope or measuring tape stretched between stakes. For a permanent range, cement or patio blocks, bricks or similar blocks can be recessed into the ground to indicate shooting positions. The distance from the target face to the shooting position could be painted on the face of the block.

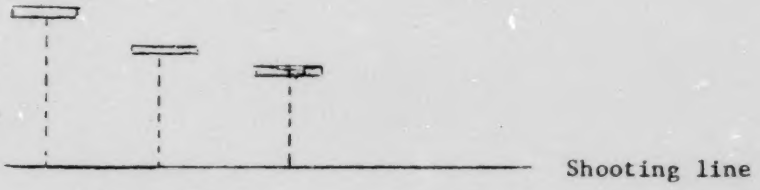
POINT OF SAFETY: *On the outdoor range, the instructor should have complete visibility behind the target line. If a backstop is used it should be of the "see-through" type (i.e., nylon net).*

When shooting from beginning distances (20' to 20 yards) there should be a minimum of 30 yards clear behind the targets if no backstop is used. A hill is a natural backstop, but care should be taken to prevent anyone wandering from behind the hill while class is in session.

A place to put bows: Outdoors, if ground quivers are used they usually have a place to hang the bow. For a permanent range it's practical to build bow racks. This can be a 2" by 4" placed in the ground with a crossarm with pegs extending from the crossarm on which to hang bows.

POINT OF SAFETY: *When students are shooting at different distances at one time, use one common shooting line and have the targets set at various distances.*

Figure 7.



General specifications for outdoor instruction range (see Figure 8, next page)

1. Posts, on which the nylon backstop net is to be hung, should be placed approximately 25' apart.

2. The net should be hung from a heavy wire (#8 clothesline) placed 9'6" from the ground. Recommended net height: 10'.

3. The target matts should be placed with a space of 3' between them.

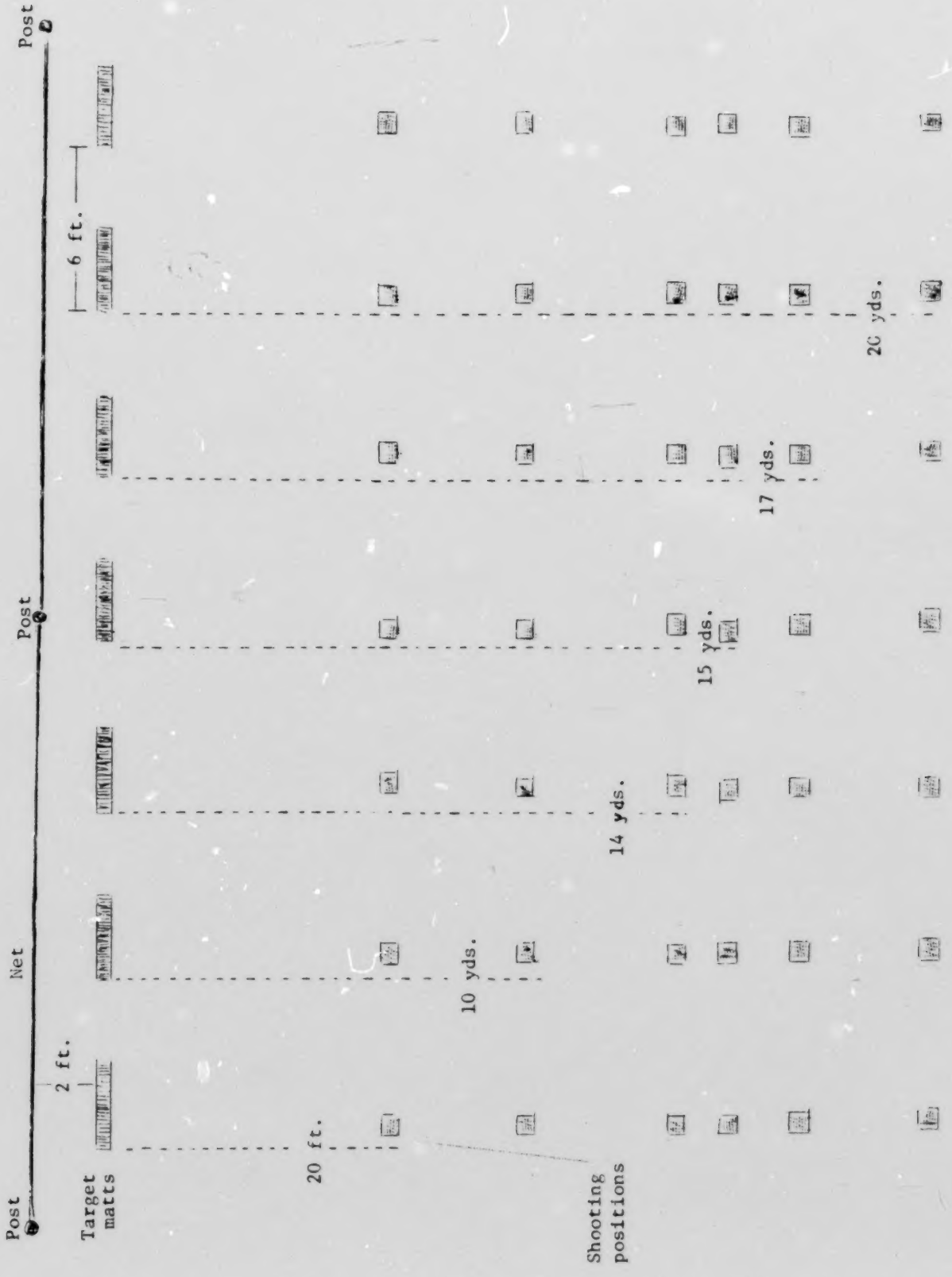
4. The stakes marking the shooting positions should be placed directly in front of each target.

5. The modified Chicago Round is shot from the 20-yard distance.

6. In the modified Flint Round, six different distances are needed: 20 feet, 10 yards, 14 yards, 15 yards, 17 yards, 20 yards.

(These rounds are described in the instruction unit.)

Figure 8. Suggested layout for an instruction range.



II. EQUIPMENT

A major factor in good group instruction is in having sufficient equipment for maximum participation. Ideally, each participant should have a complete outfit of archery equipment, but through good instructional methods a lesser amount of equipment can be effective.

While it may be the practice of the school or agency to provide equipment for instructional activities, archery is somewhat different in that it has more individual equipment which may make it more practical in some instances for the students to purchase some items, such as arm guard, finger tab, and/or arrows. Some variations in providing equipment:

1. School or agency furnishes adequate equipment for maximum class.

2. School or agency furnishes equipment for half of maximum class.

3. School or agency furnishes bows; students purchase arrows and/or arm guards and finger tabs--or these are furnished on a fee basis.

To get maximum benefit from the teaching staff and time allotment it is desirable that each student have the following:

1 bow (20# - 25#)
1 arm guard
1 finger tab
1 quiver
6 arrows

If it is not possible for each student to have a bow, one bow might be shared by two or more students. Finger tabs and arm guards can be purchased for a nominal cost and much time can be saved if <u>each</u> student has these items.

Bows

The ideal bow for any beginning instruction is relatively short (56" to 64"), light weight (not more than 20# to 25#), and of the recurve type. This enables the student to shoot without too much struggle against the weight of the bow; the short length is more efficient.

NOTE: Bow weight is given at 28" draw unless otherwise specified. For each inch under or over 28" the weight decreases or increases approximately two pounds.

Two basic materials are used in modern recurve bows:

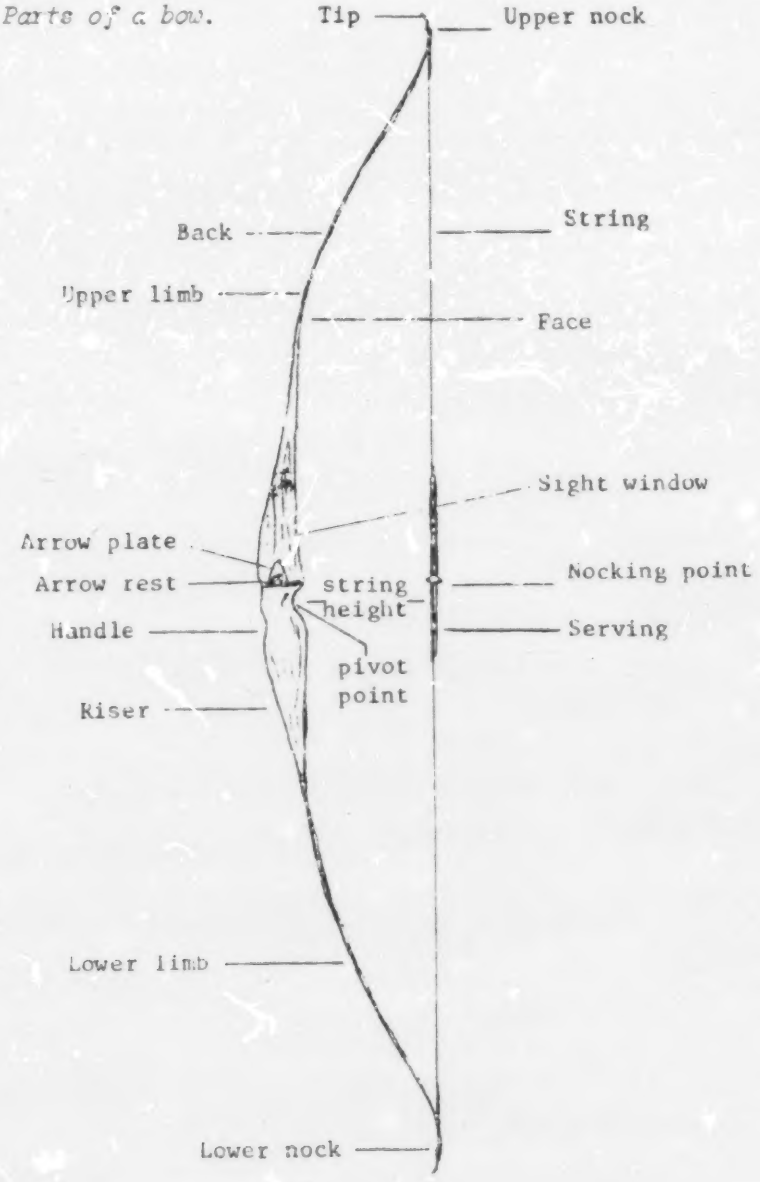
1. Bows made entirely of fiberglass--require less care and are more serviceable for beginning classes.

2. Composite (or laminated) bows are a composite of wood and fiberglass.

A laminated bow is more expensive, but has superior shooting characteristics. It is recommended that laminated bows be used for intermediate and advanced groups, but either type of bow is satisfactory for beginning instruction.

When purchasing bows, be sure to consider that some shooters will be left-handed. If purchasing fiberglass bows, secure the type that can be shot from either side; if purchasing laminated bows, about 10 percent should be left-handed.

Figure 9. Parts of a bow.



On the back of each bow mount a 7" piece of plastic or masking tape from the arrow shelf up. (NOTE: Never use adhesive tape as it "cures" with age and will damage the fiberglass.) In later instructional periods each student will be furnished a pin to put in the tape and this device will be used to learn sight shooting.

Arrows

For beginning instruction arrows need not be matched in spine and grain weight. While wood arrows are of lower initial cost, consideration should be given to purchasing fiberglass arrows, which have fewer repair and replacement problems and may, over a period of time, be more economical. Better grade arrows should be purchased in weights to match the bows being used. For example, if 25# and 30# bows are used in intermediate or advanced classes the matched arrows should be marked "25/30#" or "30/35#." Wood arrows should be of cedar, since the lowest price arrows are quite often of inferior wood and straightness.

For purposes of planning, the following averages may be helpful:

- The average adult male will use a 28" arrow.
- The average adult female will use a 26" arrow.
- The average teenager will use a 26" arrow.
- The average subteen will use a 24" arrow.

Methods of measuring students for proper arrow length:

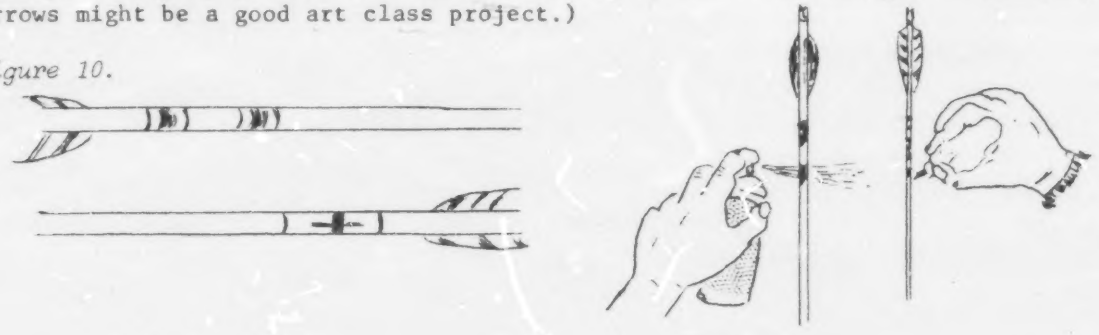
1. Place arrow nock in middle of chest, extend arms, palms together. Point of arrow should extend a minimum of 1/2" beyond the tips of the fingers when arms are stretched.

2. Use a training bow (10# or less). Secure an eye hook in the end of a 3/4" dowel, 36" long. Make a mark on the dowel 24" from the hook end and every inch to 30". Slip the bowstring through the eye hook. To measure length, have student draw to the corner of his mouth; the number of inches indicated on the dowel will be the arrow length needed.

It matters little if the arrow extends beyond the bow an inch or two for beginning instruction, but--and this is important--the arrow should never be too short.

All arrows of each student should be of the same length. Each student should have a set of arrows with matching crests and all shooters on one target should have arrows which are crested differently for easy identification. If arrows are not purchased in sets which are already crested, this can be done with a felt pen or spray paint, with students making up their own designs. (Cresting arrows might be a good art class project.)

Figure 10.



To help eliminate the problem of beginning students dropping the arrow when they first learn to draw the bow, it is advisable to either (1) pinch the arrow nocks, or (2) build up the serving on the bowstring. In either case, the nocks should be very snug on the bowstring. To pinch the nocks, heat a pan of water to the boiling point. Hold the nock of the arrow in the water for about 10 seconds, then with the thumb and forefinger pinch the ends of the nock together until the opening is almost closed. This will allow the student to snap the nock on the string and have the security of knowing that the arrow will not fall off the rest, yet it does not inhibit the flight of the arrow. If pinching the nocks is not desirable, the serving of the string, just below the nocking point, can be built up with one or two layers of dental floss.

Quivers

A side quiver of a minimum 16" length and preferably a type with a belt clip (because it can be hooked onto skirt or trousers waistband and does not require a belt) is recommended for group instruction. To prevent losing the clip tape can be wrapped around the loop attached to the quiver ring.

Arm Guards

Arm guards should be of the type with at least two straps. Training arm guards are also available which cover the area from the bicep to the wrist.

Finger Protectors

Finger tabs are preferable to gloves for group instruction because they present fewer fitting problems. A glove will take a set. Intermediate and advanced shooters may prefer to use gloves but this is more personalized equipment.

Two types of tabs: western style with two finger holes; Marshall style with a single finger hole. The Marshall style is easier to use in beginning instruction because it is simplest to fit and can be swung around on the back of the hand when not shooting.

Approximately 10 percent of the students will shoot left-handed and should have left-hand finger tabs.

POINT OF SAFETY: *Every shooter must use arm guard and finger protector.*

Bow Strings

Every bow string must have a nocking point. Commercial nocking points are available, but dental floss nocking points or plastic tape will usually suffice. The average nocking point should be approximately 1/8" above 90° from the arrow shelf to the string. This point can be found by using a folded magazine over the string to the arrow shelf; or a commercial bow square which automatically indicates the nocking point as well as measures string height. The arrow is nocked below this point.

The string loop on the upper limb will be a little larger (1/4") than the loop that fits on the lower nock of the bow. When the bow is not strung and for storing, the larger loop fits over the upper limb of the bow; the smaller loop fits into the nock. A rubber band stretched around the string and the bow will hold the lower loop in place. There are also commercial tip protectors available that will hold the string in place.

Replacement bow strings should be ordered according to length and weight of the bow. For example, if a bow is marked 56", 20#, order a 56" - 20# string. Do not order by the actual measured length of the string. (This is because the manufacturer measures the string under considerable tension.) If the bow is not marked, check with the manufacturer.

Recommended specifications for equipment for instructional use in beginning classes. (Prices are for good quality, medium-priced merchandise.)

ITEM	SPECIFICATIONS	APPROXIMATE PRICE RANGE
Bows	20# - 25#; 56" - 64"; recurve type	
	Fiberglass	6.00 - 15.00
	Laminated	20.00 - 50.00
Arrows	24" - 26" - 28" (also some 30" if teaching men)	
	Need not be matched in spine and grain weight for beginning instruction	
	Cedar	.25 - .60
	Fiberglass	1.00 - 2.50
Quivers	Side quiver with belt clip 16" or longer	.85 - 2.00
Arm guards	2-strap	1.00 - 3.00
	or training arm guard	3.00 - 6.00
Finger protectors	Marshall style tab (single finger hole)	.50 - 1.75
Target matts	36" size	18.00 - 35.00
Target faces	36" size, 4-color	1.00 - 3.50

NOTE: Personal bows should not be used in beginning classes, but may be used in intermediate instruction, and are recommended in advanced shooting. Reason: If the student has his own matched equipment, it's probable that he has shot before. It is much better to have the entire class start on an equal basis, with similar equipment. A beginner's success is not dependent upon an expensive bow.

Care and Storage of Equipment and Simple Repairs

Number all bows and other equipment that is used by more than one person for quick and easy identification. For bows, it is best to use a stick on type label on the face of the lower limb, writing the number on this label with indelible ink and then covering the label with Scotch tape. (CAUTION: *Do not use adhesive tape on bows. Also, do not use felt marking pens on composite bows as the glass will absorb the ink.*) If a permanent marking is desired, the number can be burned into the handle section on the outside (away from the sight window) with a regular wood burning tool. Numbers should be large enough so that they are recognizable at a glance.

On leather items, such as quivers and armguards, it is best to use indelible ink.

To replace a nock. Replacement nocks can be purchased from an archery supplier. The nocks should match the shafts in size; i.e., 5/16" nocks should be used on 5/16" shafts, etc. However, a 5/16" nock also can be fitted to an 11/32" shaft; an 11/32" nock will not fit a 5/16" shaft.

If part of the old nock remains on the shaft cut it away with a knife, being careful not to cut the shaft. If it is especially difficult to remove, it can be burned; however, the nock end of the arrow should be up so that the flame will not touch the feathers. Before the plastic is completely burned, the flame should be blown out and this heat should allow the nock to come off completely. Scrape the taper end of the shaft to remove any old glue. Place a drop or two of fast drying cement in the nock (not on the shaft) and push the nock onto the shaft in a continuous twisting clockwise motion. This will spread the glue all the way around the taper as well as inside the nock and, in addition, will eliminate any air pockets in the nock. After the nock is on as far as it will go, line up the index (the raised portion of the nock perpendicular to the groove) with the cock feather. Remove any excess glue and allow to dry.

To replace a point. There are two types of points; the first is the slip-over, the other is the insert point. Insert points are used only on tubular shafts such as glass or aluminum. Slipover points are used primarily on wood arrows, but may also be used on glass or aluminum.

Often wood arrows are broken on the point end. This does not mean that the arrow is useless; simply cut the shaft to the next shorter length and put on a new point. As with nocks, the point must be the proper size. Point sizes are the same as shafts, so for 5/16" shafts purchase 5/16" points, etc. It is helpful to have a taper tool which can be used for tapering the shaft for both nock and point, and also to tenon a shaft for a slipover target point. The adhesive recommended for attaching points is ferrule cement in either liquid or stick form.

Using liquid cement, coat the point end of the shaft with the cement, light it with a match and, as the flame starts to die down, push the point onto the shaft. Using the stick form, break a little chunk of the cement off the stick and put it into the point. Hold the point with a pair of pliers over an open flame until the cement melts. When it is melted, push the shaft and point together and allow to cool. In either case, after the point has cooled, use a nail and hammer to indent the four sides of the point, by holding the nail on the ferrule of the point and striking a sharp blow with the hammer. A crimping tool can also be

used. This will help keep the point in place. Insert points are handled in the same manner except that liquid cement is preferable, as it must be put on the insert part of the point rather than on the shaft. Most manufacturers include instructions with their arrows on how to replace points.

To replace a feather. It is recommended that a fletching tool be used, which should include instructions for replacing a feather. However, individual feathers can be replaced on wood arrows by purchasing die-cut feathers from an archery supplier. The die-cut feather should have the same trim and shape as the other feathers on the arrow. Prepare the shaft by scraping the place where the new feather is to be applied, so there is no rough spot. This can be done with a knife blade. Pick up the die-cut feather (being careful not to put the fingers on the quill, as it will leave oil on the quill and the glue will not adhere correctly). Place a straight pin on the trail (back) end of the feather and place this closest to the nock, pushing the straight pin into the wood shaft. Apply glue to the quill, then lay the whole quill in place in the same direction as the other feathers on the arrow and place another straight pin on the lead edge of the feather. After the feather is secured in the proper direction, put two more straight pins through the quill of the feather on either side of the feather to hold the quill in place while the glue is drying. Additional glue may be needed along the edges of the quill. There should be no bend in the quill to allow an air space between the quill and the shaft. After the glue is dry, remove the pins and put an additional drop of glue on the very lead edge of the feather, allow it to dry slightly, then press on it with the thumb so that there will be no sharp edge on the feather. A fast drying glue, such as an airplane-type cement, should be used in replacing feathers.

In nearly every community, there is an archery club or at least an archery enthusiast. It is a good idea to check with the archery supplier to try to arrange for repair of arrows. If this is not possible, it is suggested that the local archery club be contacted and, through the club, find an individual who would be interested in re-fletching and rejuvenating arrows. There are advantages in this--both in economy and in the additional help a knowledgeable person can give in other phases of the sport.

When to discard an arrow. Any arrow developing splinters or a crack should be broken immediately and thrown away. One of the hazards in archery is that of an arrow "exploding." This only happens when an arrow is used that should have been discarded. It is advisable to have students check their arrows for cracks and gouges prior to shooting in each class period. If there is ever any doubt, do not shoot the arrow. *Never try to repair a cracked arrow.* The best test to find an arrow that is cracked is to hold the arrow lightly between thumb and forefinger, by the nock of the arrow with the point toward the ground. With the other hand, snap the middle of the shaft with the finger and listen for a vibration. If the arrow is sound, there will be a dull thud, but if there is a crack in the arrow there will be a slight "tinny" vibration sound. Points can be salvaged from the arrows that are cracked and broken, but it is not practical to try to salvage the nock or feathers. An arrow that is splintered only at the point might be cut down to the next shorter length and a new point put on the shaft.

When to replace a bow string. Bow strings will last a very long time with a minimum amount of care. It is advisable to wax bow strings two or three times a season with a special bow string wax available from archery suppliers. When a

strand breaks, or the end loops of a string become frayed the string should be replaced immediately. It is unwise to try to make a bow string last a little longer, for if a string should break while the bow is at full draw there is a chance that the bow will break. There is an over-serving on the end loops and the center of the bow string. If this serving comes loose on the end loops, it can be repaired by simply winding it back in place and tying it off with the same system that is used in tying off fishing rod ferrule winds. The center serving may come loose or may wear excessively, while the rest of the string is perfectly good. This may be replaced by using regular serving thread (which can be purchased through an archery supplier) and instructions will come with the thread.

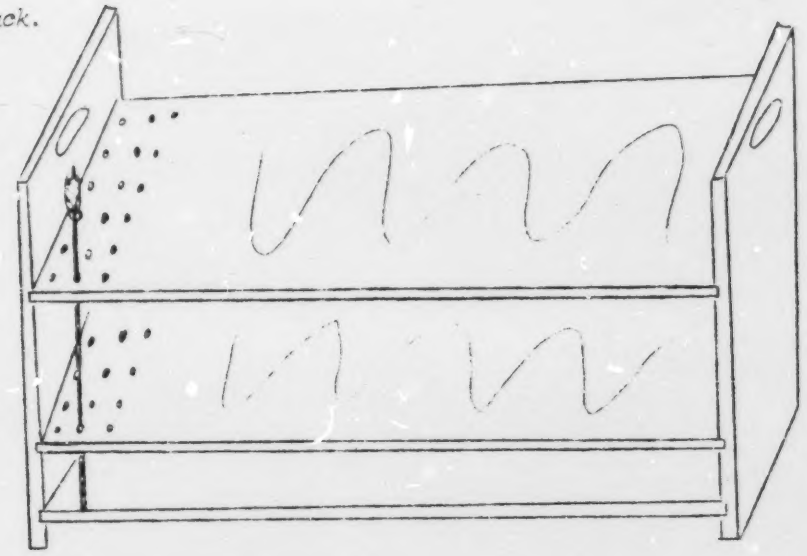
Care and storage of bows. Laminated bows may be stored in several ways. One of the best ways is to cut a piece of 1/8" Masonite with "V" notches every 2" and hang on a wall. These notches should be 1-1/4" wide at the base of the triangle. Another method of hanging laminated bows would be to nail corks into a wall so that two corks almost touch (about 1/32" between them). The upper limb of the bow is then pushed between the two corks and friction will hold the bow. There should be approximately 2" between each set of corks. A third method is a series of pegs extending out from the wall 6" to 14". The pegs should be 18" apart. Bows can be laid upon these pegs by the riser section of the bow. If metal pegs are used they should be covered with surgical tubing to avoid marring or scratching the bow. A simple way to hang bows is by the bow string on a nail in the wall. This is not recommended, as it wears the bow string and, often, the string slips off the bow and the bow falls. Laminated bows should never be suspended on pegs by the limbs.

Bows should be stored in an area that is not excessively dry or moist, and where the temperature never exceeds 85° or 90°. At least once a year each laminated bow should be given a good coat of furniture wax over the whole bow, and the string grooves and nocks cleaned of accumulated dirt. At this time, the bows should be checked and arrow rests and plates that are excessively worn should be replaced. Replacement parts for the bows can be obtained from an archery supplier. If strings on a particular bow are fraying frequently, check the nock of the bow for a sharp edge. If there is a sharp edge, carefully round it off with a light nail file.

A bow stringer should be used in stringing all bows, and most particularly, laminated bows. There is little lateral stability in a laminated bow, and continued twisting of a limb will cause the bow to break. If, for any reason, a bow should show a check mark, crack, or the bow breaks, write the manufacturer describing as accurately as possible the place and the extent of the break and inquire about the steps to be taken. Most manufacturers do not allow dealers to replace bows and, in most cases, a manufacturer will advise return of the bow for insepction.

Arrow storage and care. Arrows with wood shafts can very easily become crooked. If arrows are in constant use, it is probably best to store them in quivers between classes. One suggestion for inexpensive and lightweight storage of arrows: Use a cardboard box, with the top glued shut. Turning it upside down, punch holes in the bottom of a size to hold a set of six arrows (in or out of quivers). With a felt pen mark the arrow length on the cardboard. A rope attached to either end makes carrying easy. If arrows are going to be stored for any length of time a regular arrow rack of Masonite or plywood should be purchased or constructed (see Figure 11, next page).

Figure 11. Arrow rack.



If the feathers of an arrow become matted, hold the feathers over the steam from a teakettle and twirl the shaft in your hands. CAUTION: *Do not hold it over the steam for more than a few seconds at a time, as excessive moisture will loosen the glue.* By twirling the arrow the feather will return to its original shape.

If the arrow is excessively crooked, find the point on the shaft where it is out of line to the greatest degree and hold that point over a dry heat (such as an electric stove) until it becomes very warm. CAUTION: *Be careful not to burn the shaft.* Then, using the base of the palm of the left hand on this point, bend the arrow in the opposite direction by using the other hand on the nock end of the arrow. (Normally, the bend will be in the center of the shaft, but if it is close to the feathers or very close to the point, the arrow cannot be straightened.) Keep sighting down the shaft and applying heat and bending until the arrow is straight. Aluminum arrows can be straighteded in the same manner, but without heat. With practice it is relatively easy to straighten any arrow, except those with fiberglass shafts.

Off-season storage. Arrows should be stored in regular arrow racks so that they are held straight. Both bows and arrows should be stored in an area where there will not be excessive humidity and the temperature will not exceed 85° or 90°. Heat is the worst enemy of laminated bows, with humidity running a close second. Both heat and humidity can ruin arrows. When storing bows do not stack too many in one pile, as the weight could cause damage to the bottom bows. Arrows should be covered and a few moth balls stored with them will prevent crickets and other insects from eating the feathers. Leather accessories should be kept in a dry place safe from rodents. Laminated bows should never be suspended by the limbs nor should there be any weight on the limbs.

III. INSTRUCTION

Effective group instruction implies that each member of the class must participate in the learning activity as though he were the only member being taught. The best that is known about learning can be applied effectively to the teaching of archery and/or its component skills.

Learning is change of behavior, and this is based on two factors: (1) how the learner perceives himself; and (2) how he perceives the situation he is in. Among the crucial perceptions of the individual involved in the learning of archery are those related to the teacher's verbal instructions, the proximity of the target, the teacher's demonstrations, the attitudes and skill levels of other learners in the group, kinesthetic perceptions from his own body and the relationship of the bow and arrow to it, audio-visual aids utilized, and past experiences in learning skills, successful or not.

The teacher provides a learning environment rich in resources, and assists, guides, and facilitates learning for the individual by helping him perceive more accurately the various movements or movement patterns of which the skillful sport of archery is composed.

Very important is the teacher's attitude toward the learner. For if the individual perceives that the teacher has little or no confidence in his ability to learn archery, it is doubtful that he will make much progress. No matter how excellent the instructional techniques, if the student is not helped to see that archery has meaning to his personal living, both present and future, the instruction has not been completely effective.

The suggested procedure in the following section on instruction is a positive approach with a sequential arrangement of teaching content and methods. There is unlimited opportunity for the creative teacher to utilize new and effective methods and instructional resources.

Instructional Aids

In this method of instruction there will be ten steps in the shooting of each arrow. Probably the most important instructional aid is to have these ten steps printed on cardboard or other poster material (approximately 22" by 30", with letters at least 2" high, to be readable at the distance of 20 yards).

The words on this sign are "trigger phrases" to initiate an action:

Steps in Shooting an Arrow

	STATIC		DYNAMIC
1	Stance		
2	Nock arrow		
3	Set hook	7	Draw - anchor
4	Bow hand and arm	8	Aim - hold
5	Head up	9	Aim - release
6	Raise unit	10	Aim - follow thru

You will note that the shooting of an arrow is divided into two parts: static and dynamic. In the static part there are no muscles under any great tension; the dynamic part consists of putting the proper muscles under tension.

The sign should be placed at the right end of the target line so that it is readable by the entire class at the shooting line. It may be of value to have additional signs so that they can be placed on each end of the target line. They should be displayed anytime there is shooting--whether it be beginning, intermediate or advanced. (A major cause of poor shooting is a deficiency in basic form.)

Archery is a game of consistency, and repetition builds consistency. This sign is not only a valuable aid in reminding the students of the sequence in the repetition, but is also a valuable aid for the instructor and should be used as a checklist. The order of the steps in the instruction do not follow the sign. There is a definite safety reason for this as the class should not be allowed to nock an arrow until they are actually ready to shoot.

Instructors may also wish to create their own flipcharts to emphasize each step. Other visual aids useful in classes would include slides, movies, student demonstrations, and instant playback.

Class Organization

Prior to issuing equipment, check each student for eye dominance. This can be done in several ways. One of the simplest ways to determine this in a group is to have the students face an object, such as the target, extend the two arms, open palms toward the target. Overlap the two hands and thumbs so that there is a small opening between the two hands. With both eyes open have the students center the object in the opening made by the hands. Then have all students close left eyes. If the object remains in the opening those students should drop their hands to their sides. The remaining students should again center the object in the opening with both eyes open and again close left eyes. Those who still do not see the object in the opening with the left eye closed should shoot left-handed.

Figure 12.

(Visual dominance has nothing to do with visual acuity. The reason for this test is that the dominant eye will automatically align any lineal object projected in front of the individual with this eye. Therefore, if the left eye is dominant and the student shoots right-handed there will be a tendency to shoot consistently to the left. Occasionally there will be a student with "non-dominance" and this student can shoot from either side that seems natural.)

The instructor should call the students' attention to suitable attire for shooting and suggest that, if possible, they wear a knit shirt or fairly close

fitting blouse, preferably with short sleeves. The instructor should caution the entire class to remove all objects such as pins, pencils, loose sweaters, watches, etc., from the shooting side (left side for right-handed shooters). This is an important safety factor and the instructor should check this on the shooting line at every session.

Before issuing equipment at the first session, caution the class to just hold the items issued and not try to put on the leather or shoot an arrow until instructed to do so.

Bows should be already strung when issued to a class at the first session or sessions. (Stringing and unstringing the bow will be taught in a later class session.) It is desirable that bows be strung with a commercial bow stringer which can be purchased at moderate cost.

Student assistants can be used to check equipment out and in. After students are checked for arrow length equipment could be issued from either an equipment room or from mobile equipment racks brought to the shooting area. (For example, a chalk board on a movable stand could be adapted for a bow rack; movable arrow racks can be used; and leather accessories laid out on a table.)

All tackle should be numbered. Corresponding numbers on storage racks will facilitate checking out tackle and returning it. A student should use the same tackle in each class period. It will be helpful to make up a chart with each student's name showing the identification number of the tackle issued that student and also target assignment. (It is better psychologically if target assignments are rotated from time to time.) Students should be responsible for returning equipment to the proper place at the end of the session.

Be consistent in class procedures--this will save time and avoid confusion. Consistency in checking tackle in and out, for example, will result in a minimum amount of time in handling tackle, allowing more time for instruction and shooting.

If it is within the school policy, students should be allowed to check out tackle for use on weekends, etc. particularly at the college level (similar to checking out library books for individual use).

For the beginning instruction it is suggested that left-handed shooters be grouped at the right end of the shooting line, allowing the left-handed shooters a better view of the instructor as he demonstrates (see Figure 2, page 3).

Instruction will be at the shooting line. Regardless of the size of the class it is recommended that a partner system and Lines A and B be used. If equipment is very limited and it is necessary, a third line, Line C, can be used. If equipment is shared, particularly arrows, be sure students are matched with partners who require the same length arrows.

Explain the use of the whistle before beginning instruction:

> <u>One whistle</u> means either begin shooting or retrieve arrows. (The whistle to retrieve arrows will be blown when all shooters have completed shooting and have stepped back from the shooting line.)

Two or more whistles mean danger, or emergency situation--all shooters stop where they are, return arrows to quivers, and step back from the shooting line.

Instructional Procedure

This instruction is divided into six units. These are not necessarily designed to fit any given class period. It is up to the individual instructor to plan the time allotment.

NOTE: *Directions will be given for right-handed shooters; left-handers would do the opposite.*

Unit 1

The object of this first unit is immediate participation and immediate success. There should be no insistence on perfect form at this time.

1. Have all students at the shooting line (20') and count off by four's. Assign to targets: first group of four shoot at Target #1, next four at Target #2, and so on. 1's and 3's are Line A and remain at the shooting line; 2's and 4's are Line B and step back about four steps. Both Lines A and B follow these instructions.

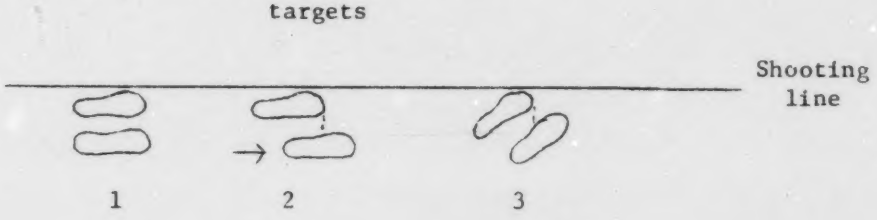
2. Demonstrate the proper placement of the quiver: Hook at the right hip with arrow nocks forward (left-handed shooters place on the left hip).

3. Explain and demonstrate the proper placement of the tab: Using Marshall style tab, smooth side up, the middle finger of the right hand goes down through the hole.

4. Explanation and placement of the arm guard: With narrow end toward the left wrist, center the arm guard on the inside of the arm between the wrist and elbow, and fasten the straps.

5. Establish stance by having students stand at right angles to and with left shoulder toward the target (left-handers stand with right shoulder toward the target). Weight should be evenly distributed and feet as wide apart as is comfortable (approximately shoulder width). Move right foot forward, toward the person in front, until instep of the right foot lines up with the toe of the left foot. Have students raise up on toes and take 1/8 turn toward the target.

Figure 13. Steps in establishing the stance.



This oblique stance is used because (1) it allows beginners to immediately use the back muscles; (2) it moves the string away from the bow arm so that there is less chance of string slap; and (3) it gives the student a secure base.

6. Bow hold: Have each student extend his left arm toward the target with the left hand in a "handshake" position. Have each student grasp the lower limb of the bow with the right hand, place the pivot point of the bow handle (see Figure 9, page 9) in the "V" formed by the thumb and forefinger of the left hand, and drop the forefinger around the back of the bow with the thumb resting lightly over the forefinger. The other three fingers should be pointing toward the target. Be sure that the pivot point touches only the meaty part of the thumb and that no other part of the hand or the palm of the hand touches the bow. The extreme of extending the last three fingers toward the target will help the student keep the palm off the bow. This should result in a relaxed hold on the bow, to avoid a "gripping" on the bow handle. The wrist should be straight, but relaxed.

   Have the student relax and hold the bow at his side, with the string up so the bow does not interfere with students on either side. Head up, look at the bullseye, raise the bow arm to shoulder height and lower again to the side.

7. Without the tab in shooting position, demonstrate and have the class all do a "Boy Scout salute" (with thumb and little finger touching over the palm and with other three fingers straight). Now establish a hook by pointing the tips of the three string fingers toward the thumb. The first three fingers are then hooked onto the string at the nocking point so that the string lays in the crease made by the first joint of each finger.

   The back of the hand should be kept straight--a cupped hand is incorrect. When the students draw you will note that the pressure of the string will force the fingers to straighten a little and this is correct. The Boy Scout salute is used to keep the thumb off the arrow, but as students shoot for a while, the thumb and little finger will relax.

8. With the completed unit (bow hold, arm straight down at side, and fingers on the string) have the class raise head to look at the bullseye, raise both arms to shoulder level, and stop. Have class draw the bow string 1", relax the fingers and let the string roll off the fingers.

   If you tell the class "1 inch" almost all will draw 3 to 5 inches; if you say "5 inches" they will draw 15 inches.

   Repeat this drawing of the string and releasing at least three more times or until the majority of the students have the feel of the release. This can be done while the bow arm remains in position so it is not necessary to go through the whole routine of forming the unit each time.

9. Establishing an anchor: With the draw hand in correct position (but not on the string--Boy Scout salute in hook position) demonstrate and have the students hook the "V" made by the thumb and forefinger behind the jawbone; lay the forefinger along the face so that the tip of the forefinger touches the

corner of the mouth, with all three string fingers still in proper hook position.

Explain to the class that archery is a game of consistency and that the anchor point is one of the most important parts of consistency in shooting. An exact anchor establishes the velocity of the arrow as the length of the drawn arrow will determine the number of pounds of the bow that are utilized. Consequently, if the bow were drawn 1" longer one time than another it would impart approximately 2 pounds more energy to the arrow. Raising or lowering an anchor point will have the same effect on trajectory as raising or lowering the rear sight of a rifle.

10 Practice draw: Have students assume the stance, establish bow hold, the hook and fingers on the string (again not using tab), straight bow arm, head up, look at the target, draw to anchor and let down. Line B may be used to used to check Line A, and vice versa.

Prior to giving this instruction, the students should be cautioned to never let go of the bow string at full draw without an arrow, as there is a possibility of breaking the bow.

CAUTION: *Never allow an arrow on the bow during this exercise.*

Repeat this several times. As the lines repeat the exercise, check each and every student for the path the string is going to travel to be sure that there is string clearance to avoid string slap on the arm. With female students be sure the string is on the outside of the breast. Some students will have a hyperextended elbow or for some other reason it appears that the string will hit the arm. This will be a minority of the group and they should be worked with individually. Two of the common ways to eliminate this problem:

a. Have the student extend the bow arm at shoulder level toward the target; bend the bow arm at the elbow and bring the handle of the bow in to the chest; then re-extend the arm; or, if this does not position the bow properly,
b. Have the student extend the bow arm toward the target at shoulder level and from the shoulder roll the whole arm, including elbow and wrist, until the bow is horizontal to the ground; straighten the bow with just a turn of the wrist without moving the rest of the arm.

11. Nocking the arrow--Line A only: With the bow hand in place and with the string against the hip, have the students take an arrow from the quiver, holding the arrow at the crest between the thumb and index finger. Push the nock of the arrow onto the string just below the nocking point. The cock feather (odd-colored feather) is away from the bow, and the shaft of the arrow lying on the arrow rest. Be sure that no student holds the arrow with the index finger of the bow hand. (Pinching the nocks [see page 11] makes this unnecessary.)

12. Using the finger tab and with the arrow now in place, have the students re-establish the stance, set the hook on the string, with index finger above and next two fingers below the nock of the arrow. Re-establish bow hold and make sure the bow arm is straight at the side. Talk the students as a group

and in unison through each of the ten steps (page 17). Head up and look at the bullseye, raise the unit, stop (elbow of the draw arm should be slightly above the plane of the arrow), draw to anchor, and release--thereby shooting an arrow.

Prior to completion of this first shot, a very short explanation of instinctive aiming should be given but not dwelt upon. It's sometimes helpful to use an analogy, such as: shooting a bow instinctively is much like throwing a baseball; concentrate and focus eyes upon the point you want to hit. Do not look at the arrow nor bow, but keep both eyes open.

After shooting the first arrow, use the ten steps and talk Line A through a second arrow. Have Lines A and B change places. Talk Line B through four arrows. Have Lines B and A change places again and talk Line A through their remaining two arrows.

Repetition is extremely important in teaching a person to shoot a bow. The repetition serves as a safety control over the class and gives the students repetitious verbal direction.

If this procedure is followed, all students should have shot a minimum of four arrows in the first 30 minutes.

In these first few arrows the instructor should be concerned only that the student does not hit his arm and is able to hit the target. The fact that perfect form is not evident is immaterial. At this point emphasis should be on "immediate participation, immediate success."

13. After all students have shot four arrows (or six if time permits) demonstrate and explain the proper methods of retrieving the arrows from the target and the ground. Explain the duties of the foursome in retrieving arrows. Have each group assign a target captain whose duty is to withdraw all arrows from the target; two arrow receivers whose duties are to record scores and to receive the arrows as the captain withdraws them from the target; and an arrow retriever who retrieves arrows that missed the target.

    It is each individual's responsibility to pick up all arrows he sees lying on the ground and give them to the arrow retriever. Caution the students to walk slowly to the target and watch for arrows on the ground. Demonstrate that an arrow buried under the grass should be withdrawn point first and be completely clear of the grass before the arrow is lifted.

    Explain and demonstrate withdrawing arrows from the target: Place the left hand flat upon the target face with the arrow shaft close to but not touching the base of the "V" made by the thumb and forefinger. During this operation the person withdrawing the arrows should be standing to the left of the arrow and leaning slightly over the top of the arrow. Grasp the arrow shaft with the right hand at a point closest to the left hand and target and pull the arrow straight out of the target. Be careful not to bend the arrow shaft up or down, right or left.

    AN IMPORTANT POINT OF SAFETY: *Stress that no one stand in front of the target while arrows are being withdrawn.*

The arrow receivers should not attempt to separate the arrows at the target. After all arrows are withdrawn and scores have been recorded, the receivers take the arrows to the shooting line before separating them and giving them back to the shooters.

POINT OF SAFETY: *The target captain has the responsibility for each member of the group--it is his job to remain in front of the target until all members of his group have started back to the shooting line.*

If the target groups are fewer or more than four people, adjust the target assignments accordingly. After assignments have been made and the withdrawing of arrows has been demonstrated have the students retrieve their arrows and return to the shooting line.

The remainder of this unit should be spent with the student shooting as much as possible with a minimum amount of instruction. However, the instructor should talk the lines through at least the first arrow of each flight.

Unit 2

Shooting distance: 20 feet.

Students shoot one flight with the instructor talking them through the ten steps for at least half the arrows.

Explain follow-through: One of the best ways to explain follow-through is to tell the students to continue to aim, with eyes focused on the bullseye and bow arm and drawing hand still in shooting position for a count of two after the release. A good trigger phrase is to "hold a pose" as for a picture. An analogy of the follow-through could be that of shooting a rifle. If, upon squeezing the trigger, the barrel is moved the bullet will be thrown off target in that direction. The same thing happens with movement in the bow arm upon release: If you drop the bow arm, you drop the arrow.

It is natural for the bow arm on a right-handed shooter to move slightly left and down on the release because of the sudden release of tension.

Have the students shoot an end concentrating on follow-through. It is recommended that at this point the instructor continue to talk the lines through at least one arrow of each flight.

The instructor explains that while Line A is shooting, the corresponding target member on Line B will be acting as student coach, and conversely while Line B is shooting, Line A will act as coaches. If there is room, the student coach should stand facing the shooter. If there is not room on the shooting line, then the coach should stand behind and slightly to the side where he can watch the shooter's anchor, release, bow arm, etc. This system enables the instructor to have better control of the class and it keeps all students occupied. It also gives the student coach a better perception of his own shooting.

The student coach's job is to remind the shooter to concentrate on the ten basic steps. The coaches should be cautioned to offer suggestions to the shooter only between arrows and not while the shooter is at full draw. Caution them never to reach through the string. The student coach/shooter relationship affords one of the best learning opportunities.

The remainder of this unit should be spent in practice to acquaint the students with the student coach situation, with emphasis on each of the ten steps, including follow-through.

Unit 3

Shooting distance: 20 feet

Begin the class by shooting one flight. The instructor should explain and demonstrate the live release. A live release is a normal reaction of the drawing hand moving back with the string rolling off the fingers as they are relaxed. This reaction of the hand is caused by the back muscles and not by pulling the fingers off the string. Emphasize that the release remains an action of relaxing the fingers and letting the string roll off and that the natural reaction of the back muscles pulling together will cause a slight backward movement of the drawing hand and a slight downward and outward movement of the bow hand.

Figure 14.

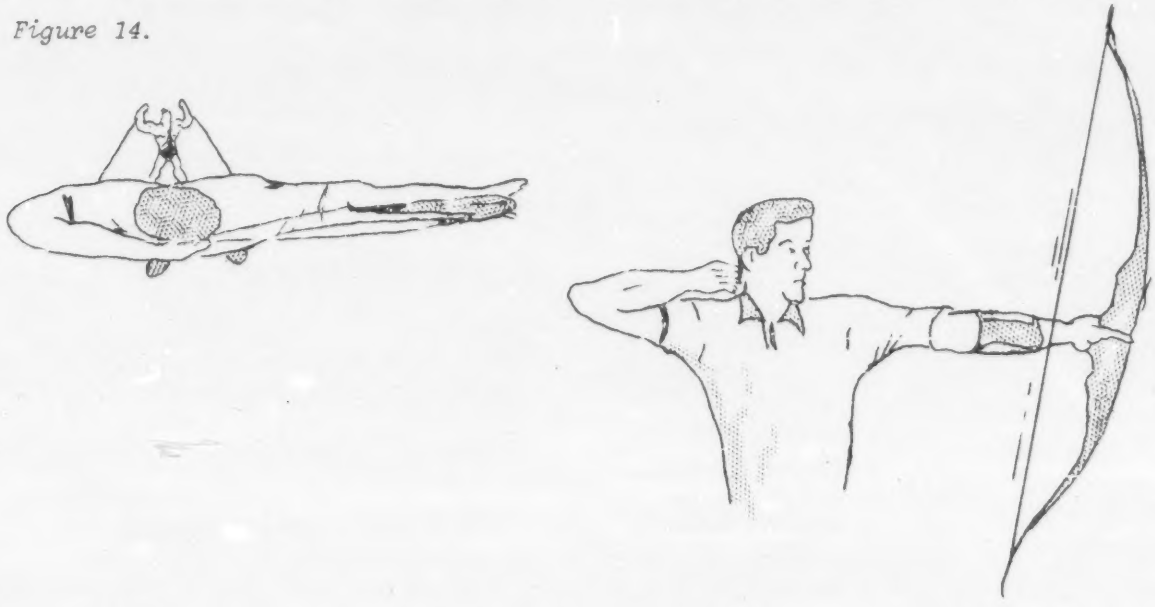
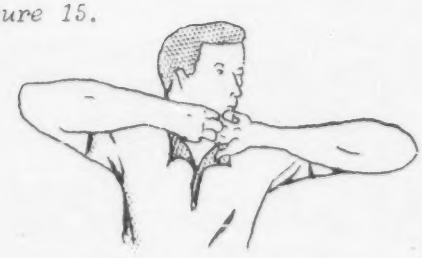


Figure 15.



An excellent way to demonstrate the action of a live release is to place the drawing hand in anchor position, invert the bow hand and hook the three fingers of the bow hand in the three fingers of the drawing hand. Holding the drawing hand in anchor position start pulling the hands in opposite directions and transfer the pull to the back muscles.

Have the students shoot one flight concentrating on live release. Utilize student coaches. Spend as much of the remaining time as possible shooting while concentrating on and repeating the basic ten steps. Reserve enough time to teach the students to unstring and string a bow.

The step-through method of bow stringing should be taught as it is the only safe method to use without the aid of a commercial, mechanical bow stringer. *(It is strongly recommended that commercial bow stringers be considered in the program.)* Students should be cautioned that improper use of the step-through method will twist the limbs of the bow and could cause the bow to break.

The step-through method of stringing a bow:

1. Check to make sure that the bottom loop of the bowstring is properly seated in the string groove on the lower limb. (A rubberband stretched around the string and the bow will hold the lower loop in place.)

2. Holding the bow by the upper limb in the right hand, step across the bow with the right leg, and return the right foot to the same position.

3. Lay the curve of the lower limb over the left ankle. With the lower loop in place hold the string taut in the left hand.

4. Place the handle of the bow under the right thigh. Keep the right knee slightly bent.

5. Place the right hand beneath the curve of the top limb--palm open. The bow should rest across the palm and base of the thumb; elbow held high.

6. Keep the left leg straight--raise the left heel off the ground, push forward with the right hand and at the same time lock the right knee so the bow bends naturally.

7. Slip the top loop of the string into place and relax--SLOWLY.

8. Check to see that the string is seated properly in the nock before releasing the tension on the bow.

Figure 16.

To unstring the bow, just reverse this process. It is a good idea to string and unstring the bow several times until it becomes easy and natural to do.

From this point on, stringing and unstringing will be done by the students at each session.

Unit 4

Shoot one flight at 20 feet, talking the students through at least one arrow.

After the first flight move the class to 15 yards.

Pre-gap method of aiming. This is a method of teaching the student to shoot without a bow sight, and an aid for teaching instinctive shooting. The principle behind it is that it sets the shooter's arm on a plane with the target and in proper position so at full draw his concentration can be entirely on the spot he wants to hit. It is important after the pre-gap spot is established and the unit is set that nothing moves except the draw to anchor. The bow arm must remain as steady as possible. The pre-gap spot does not have to be exact, as the instinctive ability of the shooter will take over as he holds at full draw and concentrates on the target and he will instinctively make the minor adjustments necessary. The pre-gap (or pre-draw-gap) method is not an end in itself, but the basic mechanics of the method give the students security in learning instinctive shooting.

Follow the basic steps in shooting through #6, raising the unit. Then:

1. Look across the point of the arrow to a pre-determined spot.

   Shooting at a 36" target from 15 yards with 20# to 25# bows, a pre-determined spot at the base of the bale, in most cases, will allow the students to at least hit the target.

   Get the sensation of "being on the spot." Maintain bow arm position and body position.

2. Shift the eyes to the center of the bullseye. Concentrate on the center holding as steady as possible.

3. Continue through the dynamic steps of shooting--draw to anchor; hold; release; follow through (maintaining body position and bow arm position until after the arrow has hit the target).

The instructor can help the students to adjust the pre-determined spot by having them note where the first arrow entered the target: if the arrow was high, lower the spot; if the arrow was low, raise the spot.

Continue to talk students through this method, arrow by arrow, for at least two flights. Remind students to shift their eyes to the bullseye prior to the draw. On the third flight explain to the students that they can see the point of the arrow in their peripheral vision while keeping their eyes on the center of the target. Have the students set their pre-gap spot without looking directly at the arrow, using only peripheral vision.

Continue to practice this procedure.

Unit 5

Shoot one flight at 15 yards using the pre-gap method.

Remind students that regardless of the distance or the method of aiming the basic form does not change.

Move the class to 20 feet. Prior to this instruction each bow should be equipped with a bow sight or a large-headed pin to be placed under the tape on the back of the bow.

Explain the placement and use of a sight. Prior to the class the instructor should sight-in one bow with a 26" arrow and note the placement of the pin. This placement should be translated in inches from the arrow shelf.

Figure 17.

Have students place the pin in the tape at the pre-determined distance from the arrow shelf, with the head of the pin projecting approximately one inch from the same side of the bow as the arrow.

Proceed with the usual basic steps. After raising the unit have the students close the left eye, and using the right eye center the pin on the center of the bulls-eye. Draw to anchor. Hold the pin as steady as possible on the center; release; and follow-through.

Let Line A and Line B each shoot one flight in this manner as long as the arrows are hitting anywhere on the target. Before retrieving the arrows explain sight adjustment. Have the students reset their pins according to their group of arrows. A simple way to explain movement of the sight is to adjust the sight in the same direction as the error: if the group is high, move the sight up; if the group is left, move the sight to the left; and so on.

Have students retrieve their arrows and shoot a second flight with the new sight setting. Once a sight is positioned for success at a given distance it should be marked for each individual shooter.

Have students retrieve their arrows and go immediately to the 15-yard shooting line.

Explain the low anchor. This is an under-the-chin anchor. At the point where the unit is raised and is ready to draw, a suggested explanation is to tilt the chin up and out, stretching the skin of the neck tight. With the drawing arm at shoulder level draw the string until it touches the chin, and until the thumb of the drawing hand touches the throat. Slide the drawing hand up until it is stopped by the chin. Lower the head until the nose touches and is centered on the string. Drop the little finger on the drawing hand down and in until it touches the clothing.

Practice this draw and anchor several times before shooting an arrow.

As the students practice this anchor check the draw arm elbow position. Many students will let this elbow drop down, making the draw to anchor and holding difficult. Correct this as recommended in "Instructional Tips" (#26, page 36).

Have the students shoot an arrow with an under-the-chin anchor from 15 yards using the same sight setting as with a high anchor at 20 feet. If the student hits the target on the first arrow he should retain the same sight setting and shoot the remainder of his arrows. When he has finished shooting his arrows, he should then readjust the sight setting as above.

The remainder of this unit should be spent on practicing sight shooting with the low anchor.

At the end of this unit reserve enough time for a short discussion period. Inform the students that they have been exposed to two different types of anchor--high and low--and two different methods of aiming--instinctive and sight; and that from this point on they should choose the methods of anchor and aiming that they prefer; stick with them and develop their form.

Unit 6

Organize and shoot a competitive round.

Listed below are two rounds that are adaptable to instructional use. In conducting a competitive round or tournament, two practice flights should be allowed before the scoring begins.

Instructional Round I.

20 yards at 36" 4-color faces; score: 5 - 4 - 3 - 2 - 1
Three games of four flights each--total of 12 flights--5 arrows per flight
Total of 60 arrows
Perfect score: 300

Instructional Round II. (American Archery Council Instructional Round)

1. Modified Chicago Round
   20 yards--36" 4-color faces; score 5 - 4 - 3 - 2 - 1
   6 flights--5 arrows each
   Total of 30 arrows
   Perfect score: 150

2. Modified Flint Round

Station 1	4 arrows at 17 yards - 18" face	Score: 5 - 3
Station 2	4 arrows at 20 feet - 12" face	Total of 30 arrows
Station 3	4 arrows at 20 yards - 18" face	Perfect score: 150
Station 4	4 arrows at 14 yards - 12" face	
Station 5	4 arrows at 15 yards - 18" face	
Station 6	4 arrows at 10 yards - 12" face	
Station 7	1 arrow each at 20 yds., 17 yds., 15 yds., 14 yds., 10 yds., 20 ft. - 18" face	

Perfect score for Round II: 300

The purpose of these rounds is to expose students to the mechanics of a tournament. The instructor might also wish to use the scores as a part of the skill evaluation.

The basic philosophy underlying this method of instruction is to give the student an activity with lifetime participation values and to teach him to have fun shooting a bow and arrow. In order to achieve this goal, the instruction is based on immediate participation and immediate success. As an example, the targets are placed on the ground, because extensive research has proved that fewer arrows miss the target completely than when the target is at the traditional 48" level and thus more class time is spent actually shooting and less time is spent looking for arrows. In addition, the beginning shooter has a tendency to shoot high because he wants to look at the point of his arrow. Having targets on the ground and starting at a short distance (20 feet) the student tends to lower the bow arm and therefore hits the target with the first arrow. This combination of short distance, light weight bow, targets on the ground, and the instructional procedure presented here helps insure immediate participation (student shooting in the first class period) and immediate success (hitting the target with the first group of arrows).

This manual and the method presented is based on the premise that these are beginning classes and the goal is to provide opportunities for all to learn basic archery skills. It is not expected that the individual will stop with this basic instruction. As in other sports comparable to archery, there will be a number of participants who wish to improve their skills and enter the competitive field, engage in bowhunting, and other activities.

Each instructor should be aware of the potentials. The Junior Olympic program is one avenue for young people interested in competition. Almost every archery organization has programs designed for schools. Archery is being included in the Olympics and the National Archery Association is the U. S. representative.

Skill and Knowledge Testing and Evaluation

Two types of evaluation by instructor:

1. Skill testing--shooting form and accuracy.
   a. Score for a given number of arrows (Charting each student's score each time the class shoots for score will indicate to the student his progress.)
   b. Performance of ten basic steps of shooting (The instructor might wish to use a checklist--students' names with columns such as "Stance," "Nock," "Draw," "Release," etc., to check on satisfactory form.)

2. Written test of knowledge (see sample questions on the next pages). Each instructor should make up his own tests based on the material covered in class.

Basic grade distribution: (used by one college instructor)

Knowledge test	30%	
Shooting skill	30%	(Progression should be considered)
Shooting form	30%	
Attendance, attitude, etc.	10%	

Some important phases of archery that should be tested:

1. Safety rules
2. The ten basic steps in shooting an arrow
3. Nomenclature of bow and arrow
4. Location of nocking point
5. How to determine arrow length
6. How to determine proper bow string length
7. How to score
8. How to string a bow
9. Two methods of shooting
10. Archery terminology
11. Archery etiquette
12. Shooting form and accuracy

Sample test questions:

T F 1. The single most important phase in archery is consistency.

T F 2. To raise the arrow in sight shooting you lower the sight.

T F 3. The anchor point should vary according to the elevation of the target.

T F 4. The drawing elbow should be above the arrow level when the shooter is at full draw.

T F 5. When the whistle is blown once and the shooter is on the shooting line he may then nock his arrow.

6. The (oblique) stance is used in class.

7. To practice (instinctive) shooting you can use the pre-gap method.

8. The bow moves to the (left) and (down) after the release.

9. The odd-colored feather is the (cock) feather.

(e) 10. To release the string we allow the fingers to do what?

(c,g) 11. What are the two important reasons for a consistent anchor point?

(f) 12. The arrow forms what angle with the string?

(a) 13. A sight is used with this method of shooting.

(h) 14. We use these muscles to relieve the pressure on the drawing arm.

a. free style
b. instinctive
c. rear sight
d. forearm
e. relax
f. right
g. velocity
h. back

15. List, in order, the ten basic steps in shooting an arrow.

16. What are the reasons for using the oblique stance?

17. Describe the action of the drawing hand upon release and follow through.

18. How can you determine if you should be shooting right or left-handed?

19. Explain how to establish the high anchor point; the low anchor point.

20. Upon establishing your gap, in instinctive shooting, your eyes should focus upon:

a. point of arrow
b. center of the target
c. nock of arrow
d. all of these

21. The third step in the basic steps in shooting an arrow is:

a. straight arm
b. nock arrow
c. draw
d. set hook

22. The bow should be held in the handshake position with:

a. all fingers extended
b. all except index finger and thumb extended
c. only thumb and index finger extended
d. none of these

23. When establishing the deep hook, the thumb touches:

a. the little finger
b. the ear
c. the middle finger
d. the nock

24. The important reason for the oblique stance is

a. balance
b. eliminate string hitting the bow arm
c. shooter uses back muscles
d. all of these

Correlation of Archery Instruction with Other Areas of Interest and Study

Instruction in archery has great potential for correlation with other areas of study in the school curriculum, and with other program activities in camps, recreation agencies, and organizations. While archery skills and games are usually taught in physical education and recreation classes or through clubs, after-school programs, camping and recreation activities, there are many aspects of archery which are appropriate in other areas of study. The history of the sport, the mechanics involved, the equipment used, and the health and exercise value can serve as motivation and content in a variety of programs. In schools, particularly, there are unique opportunities for team teaching in cooperative units involving archery instruction with other subject matter areas. While space will not permit a detailed description of all the possible relationships to other subjects and activities, a few examples are suggested.

English and literature:

- Greek mythology related to the constellation Sagittarius
- Robin Hood story
- William Tell play
- James Fenimore Cooper books
- Reports and themes on some phase of archery

Art:

- Sculpture and drawings related to archery--form and design
- Posters and signs illustrating form and techniques
- Camouflage in hunting
- Diagrams of bows, flight of arrow, etc.

Industrial arts and crafts:

- Building storage racks, instructional charts
- Repair of arrows
- Indian crafts, such as cordage

Science and math:

- Arrowheads
- Use of wood and glass
- Flight of arrows
- Velocity, angles, leverage

Social studies:

- Relationship of archery to history of man and events
- Indian history

Health and physical development:

- Effect on posture
- Muscle development
- Self discipline
- Release of tension

Instruction Tips

1. Put the bow in the student's hand as soon as possible so he can understand the tool while basics are explained.

2. Be sure to check for pins, loose sleeves, etc., on the bow side of the student before allowing him to shoot.

3. Check the student's finger tab closely before he shoots. There may be a tendency to not put it all the way on.

4. Watch for four fingers on the string. Often a student will use the little finger on the draw hand, and it is difficult to spot.

5. Look for cramped fingers on the bow string. Frequently, a student will tend to point the fingers down rather than horrizontally which causes the arrow to stay on the string but not on the bow.

6. Watch the thumb on the draw hand. Students have a tendency to push the nock as they place the fingers on the string. Correct this early and often until the fault is eliminated.

7. If the student masters the draw and anchor quite readily, stand behind him and check the string path before allowing the student to shoot an arrow. Never allow a student to hit his arm.

8. Let students shoot the first arrow as soon as possible even if the bow hand, anchor, draw, etc. are not good. Work on these after they have tasted the success of shooting a couple of arrows.

9. The tone of the instructor's voice will convey many things, both good and bad. Try to keep an enthusiastic approach in your voice and actions.

10. Use a positive approach in all instructions. Minimize the use of the word "don't." Use praise sincerely whenever possible.

11. The first time your student hits the target, he has accomplished a great feat and is very proud of himself. Be sure to give just and exuberant praise.

12. The law of cause and effect is of utmost importance in instruction. Analyze the fault to find the cause before making a correction. Often the cause of an error is hidden by the obvious effect of the error. A good example is bow arm movement. Many times this is caused by a forward release, but to the self-styled shooter the error is simply a moved bow arm.

13. Never correct a student after spotting a fault on one arrow shot. Watch him shoot several arrows so that the cause of the fault may be determined and then correct him.

14. Usually it's best to avoid emphasizing what a student is doing <u>wrong</u>. Suggest a correction to him.

15. Don't over-instruct. The more you talk and bring up various problems, the more confused the student will become.

16. Stick to the ten basic steps in shooting and repeat them constantly. Repetition will make the student comfortable.

17. It is permissible and correct to draw a bow without an arrow to demonstrate a part of shooting to the class. However, when this is first done, the class should be cautioned about the danger of drawing a bow with someone standing in front of them and the possible results of the accidental firing of a dry bow.

18. Demonstrations of the component skills are useful in the instruction, however the instructor should not demonstrate his personal shooting ability, especially in the beginning stages of a class.

19. Be very careful in demonstrating things such as pulling arrows, where you stand when checking a student at full draw, etc. People tend to imitate and anything the instructor does in class automatically becomes an accepted method by the students.

20. Use problems as they develop to your instructional advantage. For example, if an arrow drops off a student's bow while the class is shooting, stop the whole class and explain the rule of retrieving the arrow and the rule for an arrow that hangs from the target.

21. One of the common faults with beginning students is an arrow that falls from the arrow shelf. The flipping is caused by the fingers rolling the string away from the bow. By taking a deeper hook on the string and securing the string in the crease of the first joint, the resistance of the bow weight while drawing will cause the fingers to straighten slightly and roll the string in toward the bow, thereby holding the arrow on the shelf. If this problem persists, demonstrate and explain the student's own control of the arrow. This is done by intentionally rolling the string hand and bending the wrist away from the bow to take the arrow away from the shelf; then bringing it back in by straightening the wrist. Repeat this two or three times. This will help to eliminate the arrow's coming off the shelf when the student first draws an arrow.

22. In most cases on the practice draw, the student will automatically twist the upper trunk while holding the bow shoulder and bow arm in correct position. However, in some cases, particularly in women, the tendency will be to draw the bow without twisting the top half of the body. In this case, stand facing the student when he is in position just prior to the draw, with bow arm extended toward the target and fingers on the string. Ask the student to start the draw to anchor and as he draws put one hand on either side of his waist and lightly twist the top half of his body to the right. In most cases this will immediately eliminate the problem, but occasionally it may have to be repeated two or three times. This same correction is used when a female student continually draws the string to the inside of the breast.

23. The elbow of the drawing arm should be higher than the plane of the arrow upon beginning to draw, through and including the follow through.

24. "Pose" in the follow through; continue to aim, with the eyes focused on the center of the bullseye.

25. Release problem: relax small finger and thumb of drawing hand.

26. Use the point of an arrow to lightly touch the student's elbow when he has a tendency to collapse the elbow. This will cause him to immediately pull harder and raise the elbow.

27. Caution student coach not to put hand or any object such as an arrow through the area between the drawn string and extended bow hand.

28. If hand remains at the face upon release the student is not pulling, but is plucking the fingers off the string.

29. Don't over-emphasize movement of the bow arm.

30. The instructor can easily see if any arrow will completely miss the target on the first arrow during the pre-gap instruction. This is done by standing at the side to look at the angle of all arrows while students are at a practice full draw.

31. Stress consistency of form--form does not change regardless of distance, method of aiming used, or type of activity (including archery games).

32. Keep little finger close to the neck or clothing at anchor point.

Archery Etiquette

With beginning shooters several courtesies should be established. They could include the following items.

1. Don't talk to or disturb shooters on either side when they are shooting.

2. Care should be taken with bow movements; avoid any "jabbing" of your neighbors.

3. Avoid loud laughter or talk behind the shooting line, as beginners sometimes mistake it for personal criticism.

4. Stay at the shooting line until your partner has shot his last arrow, then step back together. (It's much easier to shoot that last arrow when he's not the only one on the line.)

5. Never shoot another person's personal bow. You may overdraw without realizing it, and you may damage the cast of the bow, or break it. Besides, it is his "pride and joy" and very private.

6. Be sincere when counting score--always be a good sport.

General Safety Points

1. Shoes should be worn on the archery range at all times.

2. Always remember that a "loaded" bow is a deadly weapon.

3. There should be no shooting except at targets.

4. Never show your skill as an archer by using a human target or by permitting anyone to hold a target for you.

5. Use care in handling and carrying equipment. Do not run with arrows held in the hand, etc.

6. One member of a target group should always stand in front of the target while others are looking for lost arrows. If alone, place your strung bow in front of & across the face of the target, to indicate someone is behind the target.

7. In field archery, call "Timber" prior to shooting. Warn others who are walking away from the target at a distance.

8. When an arrow or bow falls in front of the shooting line, caution the student to wait to retrieve it until the persons on each side of him have completed shooting. The bow or arrow must be reached without interfering with safety. If it can be reached without stepping across the shooting line, the item may be retrieved and shooting continue. An arrow that falls out of reach is considered "shot." During a class it is best to blow the whistle to stop the entire class and have the student pick up his equipment.

9. Hanging arrow on the target: Blow the whistle to stop the class; remove the arrow from the hanging position and insert it back into the target at the correct scoring area.

10. Students should be cautioned to always keep a safe distance behind (or to the side) when arrows are being withdrawn from the target. An arrow suddenly jerked out of the target could cause severe injury.

11. Never use imperfect or inferior equipment, such as cracked arrows, arrows with fletching or point missing, cracked bows or bows with frayed strings.

12. Never shoot arrows that are too short.

13. Always use an arm guard and finger protector.

14. Always unstring the bow after completing a session of shooting.

15. An archery range should be supervised at all times that there is shooting under way.

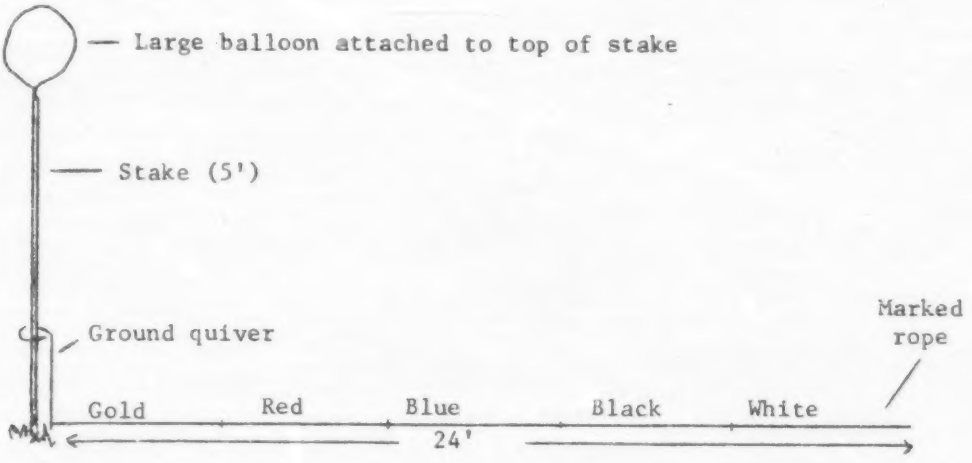
IV. ARCHERY GAMES

Tic Tac Toe. Place three rows of three balloons on a target matt. Divide the group into two lines, A and B, and have them stand in single file 15 yards from the target. (If the group is under 14 years of age a distance of 20 feet is sufficient.) Each group will have a captain who will be responsible for indicating to each team member which balloon he should shoot. At the signal to shoot, each captain will shoot one arrow and step back. The second and each succeeding person will shoot--one at a time--when ready, then go to the back of the line. The first team to break three balloons in any line is the winning team. As a point of safety, no one should be allowed to take an arrow out of his quiver until he is standing on the shooting line.

Wand Shooting. Place a one-inch strip of masking tape over the target face from top to bottom. The group is divided into teams as for Tic Tac Toe and the shooting rules are the same. A game is the best two out of three points. A point is scored when an arrow hits the tape anywhere on the target. When an arrow hits or looks like it hits, the range captain will blow his whistle and call the arrow. When one team has two points they are declared the winner.

Clout Shooting. This is not a regulation clout. The distance is 90 yards from the shooting line to the center of the target. Drive a five-foot wooden stake into the ground for the center of the target. Attach a large (one-foot diameter) brightly colored balloon to the top of the stake as a marker. The clout is then scored and shot like a regular clout except that only four ends are shot. The competition is between total team scores. Any team that breaks the balloon gets an additional 50 points added to their total score.

Figure 18.



(Rope can be attached to ground quiver. The stake can then be removed when scoring, thus letting the rope rotate more easily for more accurate scoring.)

Bird Shooting. Flu flu arrows are needed for this game, along with at least six commercial bird targets or 16-inch circular discs cut out of heavy cardboard. Two teams are lined up as for Tic Tac Toe. The bird thrower should be to one side of the shooters and hidden from view if possible. When the two teams are on the line with arrows nocked the range captain calls "Pull." The bird thrower can throw the bird at any time within 20 seconds after the call and at any elevation or angle. It is suggested that the birds be thrown across and in front of the shooters at a distance of no more than 10 yards. Each member of both teams should have at least three shots. Any hit (determined by the range captain) scores one point. High team score wins the game.

Rabbit Shooting. Flu flu arrows are also used for this game. Also needed are balloons of about 6 inches in diameter. This game can be played only if there is some breeze. The teams are lined up as in Tic Tac Toe. An assistant is placed on the upwind side of the shooters. Upon a hand signal from the range captain he releases two balloons so that they will blow across and about 15 yards in front of the shooters. After releasing the balloons the assistant moves back quickly. The shooters may not shoot until the range captain blows his whistle, which he does as soon as he feels the assistant is out of shooting range. When the range captain blows his whistle again, all shooting stops. Sometimes it is possible for three or four people to shoot before the balloons are out of range. When one or both balloons are broken or are out of range, the range captain stops the shooting and has the assistant release two more. A time limit may be set, or the game ended when a certain number of balloons have been released. The team with the highest number of hits wins the game.

Roving Archery. Small groups of roving archers pick targets at random at varying distances (such as a bush, clump of grass, old stump, etc.) and each shoots one arrow. The archer who hits the target or comes closest earns one point and also chooses the next target. The winner is the archer with the most points.

V. ADVANCED INSTRUCTION

(This section is not yet completed, but will be added later.)

GLOSSARY

Anchor point: A certain spot on the shooter's face which the index finger of the string hand comes to on the draw to give consistency to shooting.
Arm guard: Protects the arm from the bow string; usually leather and worn on the inside of the forearm.
Arrow plate: A substance on the side of the bow to give point contact.
Arrow rest: An extraneous device on the bow to provide point contact; also a resting point.
Back: The side of the bow that is away from the shooter.
Blunt: A blunt-tipped arrow, often used for small game.
Bow arm: The arm that holds the bow and not the string.
Bow sight: A device that allows the shooter to sight directly on the target, which cannot be done with the arrow tip except at point-blank range.
Bow string: The string of a bow, usually made of dacron.
Broadhead: An arrow with sharpened metal tip for hunting live game.
Butt: Any backstop for holding arrows shot at a target.
Cant: To hold the bow tilted or slightly turned while shooting.
Cast: The distance a bow can shoot an arrow.
Cock feather: The arrow feather at right angles to the nock; often of a different color than the other feathers.
Creeping: Letting the shooting hand edge forward before release.
Crest: Paint or decoration near the arrow feathers.
Draw: To pull the bow string back into the anchor position.
Drawing arm: The arm that draws the bow string back.
Drift: Natural deflection of an arrow from its normal path due to outside factors, such as wind.
End loop: That part of the string fitting over the bow nock.
Face: That part of the bow facing the shooter. Also, a target face.
Fast: An expression used to warn people of arrows being shot.
Field archery: A competitive round shot at various distances and laid out like a golf course.
Field arrow: Arrow with field point, used outdoors for stump shooting, roving, and small game.
Finger tab: Tab worn on the drawing hand to protect the fingers and give a smoother release of the bow string.
Fletching: The feathers of the arrow.
Flight: Number of arrows shot at one time (or position) before retrieving. Also, competitive round of shooting for distance; Also, path of an arrow.
Free style: Shooting with the aid of a bow sight.
Glove: Worn to protect the fingers from the string.
Grip: The handle of the bow, held by the shooter when shooting.
Handle Riser: The center part of the bow.
Head: The tip or point of an arrow.
Hen feathers: The two feathers not at right angles to the nock, usually the same color and used along with the cock feather to give guidance to the arrow's flight.
Hold: To grip the bow; or to hesitate at full draw.
Index: A raised piece of plastic on the nock of an arrow that is in line with the cock feather.
Instinctive Shooting: Aiming and shooting arrows instinctively, rather than with the aid of a bow sight, pre-gap or point-of-aim methods.

Jerking: Letting the shooting hand jerk too far back as the arrow is released.
Kick: The recoil of the bow string and bow after the arrow is shot.
Limbs: The two ends of a bow, from the handle riser out. The limbs bend and give the arrow the spring that propels it.
Laminate: A composite bow usually of wood and fiber glass.
Longbow: A bow with no recurve.
Nock: The groove in the end of an arrow in which the bow string fits; also the grooves at both ends of the bow, which hold the bow string.
Nocking point: The marked place on the bow string where the arrow nock is placed before drawing and releasing.
Overbowed: Using a bow that is too strong for the individual.
Overdraw: Drawing the arrow back too far, so that the tip passes the face of the bow. DANGEROUS.
Point: The tip on the end of the arrow.
Point blank range: The only distance from the target at which the point of aim is right on the target.
Pre-gap: A method of aiming (see page 27).
Point of aim: A method of aiming by using a point, usually in front of the target on which the point of the arrow is placed in line with the eye. This allows for trajectory of the arrow.
Quiver: Something to hold arrows; can be ground, back, or pocket.
Recurve: A bow curved on the ends.
Reflexed bow: A bow with limb ends curving toward the back rather than toward the face of the bow.
Release: To let the bow string slip off the finger tips.
Roving: A game played by two or more in the out-of-doors in which natural targets (stumps, trees, bushes) are selected for accuracy competition.
Self arrow: An arrow made entirely of one piece of wood.
Self bow: Bow made entirely of one piece of wood as opposed to bows such as laminates.
Serving: The thread wrapped about the bow string to prevent fraying of the string.
Shaft: The middle of an arrow; unfletched arrow.
Shelf: The place on the bow where the arrow rests.
Shooting tab: A device to protect the fingers of the string hand.
Sinking: The gradual loss of a bow's power.
String: To prepare a bow for shooting. Also, the bow string.
Stance: Position assumed in shooting an arrow.
String fingers: The three fingers used to draw back the bow string.
String height: The distance between the bow and the bow string at the handle. (Formerly, "fistmele"--a clenched fist with the thumb raised--was the approximate unit of measure for the correct distance.)
Strung bow: A bow that is ready to shoot.
Solid bow: Common reference made to bow of fiberglass or plastics.
Target archery: A competitive round shot at fixed distances in an open field.
Target arrow: A light weight arrow with target point.
Throwing: Moving the bow hand to the left while shooting.
Understrung: A bow with a bow string that is too long.
Vane: A plastic feather on an arrow.
Weight: The amount of effort (in pounds) required to pull the bow (normally measured at 28").
Weight in hand: The actual weight of the bow.
Windage: The amount of drift in the flight of an arrow caused by wind.
Wobble: The erratic motion of a flying arrow.

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Archery World. 24 South Reading Avenue, Boyertown, Pennsylvania 19512.

Bow and Arrow. Covina, California.

Films

Archery for Girls. 16 mm, B&W, sound, 10 min. Coronet Instructional Films. (This does not follow the instructional procedure presented here, but the film is helpful if the modifications are explained.)

Beginning Archery (rev. 1962). Set of four slidefilm units. Purchase from the Athletic Institute, 805 Merchandise Mart, Chicago, Illinois 60654; or rent from any branch office of Ideal Pictures.

The World of Archery. American Archery Council, 100 East Ohio Street, Chicago, Illinois 60611.

Archery Organizations

The American Archery Council (100 East Ohio Street, Chicago, Illinois 60611) is composed of all the national archery organizations, including:

American Indoor Archery Association
Archery Manufacturers Organization
National Archery Association
National Field Archery Association
Professional Archers Association